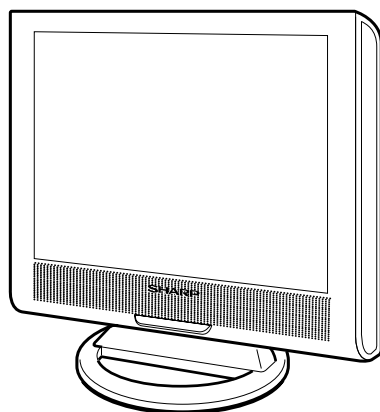


LOEWE.**SERVICE MANUAL**
LCD COLOUR TELEVISION
Art. Nr. 60415 A60
MODEL **FL38**
(LC-15A2L)

In the interests of user-safety (Required by safety regulations in some countries) the set should be restored to its original condition and only parts identical to those specified should be used.

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IMPORTANT SERVICE SAFETY PRECAUTION

Service work should be performed only by qualified service technicians who are thoroughly familiar with all safety checks and the servicing guidelines which follow:

WARNING

1. For continued safety, no modification of any circuit should be attempted.
2. Disconnect AC power before servicing.

CAUTION

FOR CONTINUED PROTECTION AGAINST A RISK OF FIRE REPLACE ONLY WITH SAME TYPE FUSE.

F1 (2A, 250V), F2 (1.6A, 250V), F3 (1.6A, 250V), F4 (315mA, 250V) FUSE.

BEFORE RETURNING THE RECEIVER (Fire & Shock Hazard)

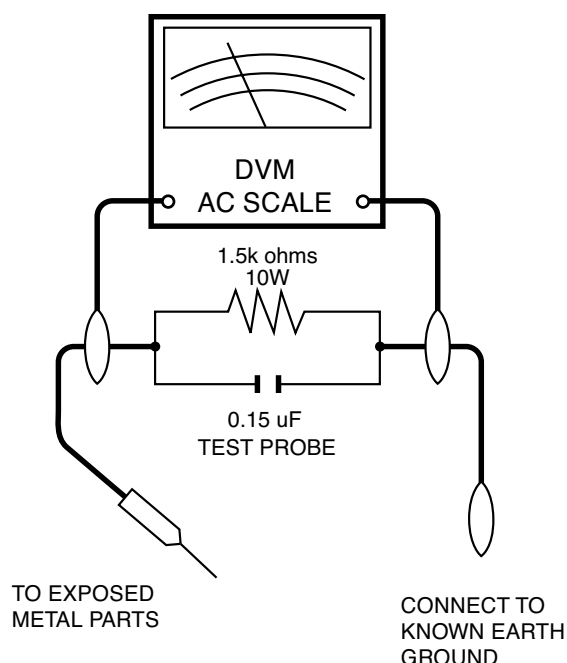
Before returning the receiver to the user, perform the following safety checks:

1. Inspect all lead dress to make certain that leads are not pinched, and check that hardware is not lodged between the chassis and other metal parts in the receiver.
2. Inspect all protective devices such as non-metallic control knobs, insulation materials, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacitor networks, mechanical insulators, etc.
3. To be sure that no shock hazard exists, check for leakage current in the following manner.
 - Plug the AC cord directly into a 110~240 volt AC outlet, and connect the DC power cable into the receiver's DC jack. (Do not use an isolation transformer for this test).
 - Using two clip leads, connect a 1.5k ohm, 10 watt resistor paralleled by a 0.15 μ F capacitor in series with all exposed metal cabinet parts and a known earth ground, such as electrical conduit or electrical ground connected to earth ground.

- Use an AC voltmeter having with 5000 ohm per volt, or higher, sensitivity or measure the AC voltage drop across the resistor.
- Connect the resistor connection to all exposed metal parts having a return to the chassis (antenna, metal cabinet, screw heads, knobs and control shafts, escutcheon and etc.) and measure the AC voltage drop across the resistor.

All checks must be repeated with the AC cord plug connection reversed. (If necessary, a nonpolarized adaptor plug must be used only for the purpose of completing these checks.)

Any reading of 0.75V peak (this corresponds to 0.5 milliamp. peak AC.) or more is excessive and indicates a potential shock hazard which must be corrected before returning the monitor to the owner.



SAFETY NOTICE

Many electrical and mechanical parts in LCD television have special safety-related characteristics. These characteristics are often not evident from visual inspection, nor can protection afforded by them be necessarily increased by using replacement components rated for higher voltage, wattage and etc.

Replacement parts which have these special safety characteristics are identified in this manual; electrical components having such features are identified by "!"

and shaded areas in the **Replacement Parts Lists** and **Schematic Diagrams**.

For continued protection, replacement parts must be identical to those used in the original circuit.

The use of a substitute replacement parts which do not have the same safety characteristics as the factory recommended replacement parts shown in this service manual, may create shock, fire or other hazards.

ELECTRICAL SPECIFICATIONS

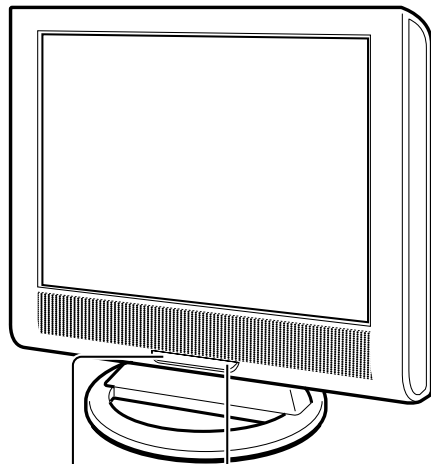
Items	15" LCD COLOUR TV, Model: LC-15A2L
LCD panel	15" TFT LCD
Number of pixels	921,600 dots
Video colour system	PAL/NTSC/SECAM
TV FUNCTION	
TV Standard (CCIR)	BG/DK/I/L
TV Tuning System	Auto preset 100 ch.
STEREO/BILINGUAL	NICAM, IGR
AUTO PRESET	Yes
CATV	~Hyper Band
Brightness	400 cd/m ²
Lamp life	60,000 hours
Viewing angles	H: 160° V: 160°
Audio amplifier	0.6 W 2, 2.5 W 1
Speakers	3 4 cm 2 pcs., 65 mm 1 pc.
Terminals	
AV1	VIDEO, S-VIDEO-IN, RGB, AUDIO
AV2	VIDEO, AUDIO
OUT	AUDIO
ANTENNA	DIN
HEADPHONE	3.5 mm jack (Rear)
OSD language	English/German/Dutch/French/Italian/Spanish/Swedish
Power requirement	DC 12V, AC 110 - 240 V, 50/60 Hz
Power consumption	27W (Connected to DC12V)
Weight	5.9 kg(approx.), incl. stand, excl. accessories
Accessories	R/C, Batteries, AC adapter, AC cord, Operation manual, Cable clamp

Specifications are subject to change without prior notice.

OPERATION MANUAL

Front view

Controls



Remote sensor window
(The actual location is not visible.)

Power/Standby indicator

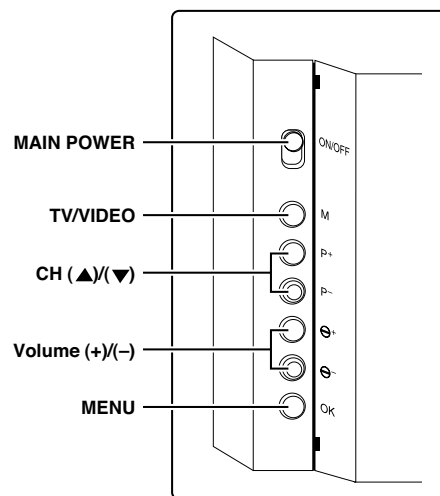
A green indicator lights when the power is on and a red indicator lights when in the standby mode (the indicator will not light when the main power is off).

Note:

- **TV/VIDEO**, **CH (▲)/(▼)**, and **Volume (+)/(-)** on the main unit have the same functions as the same buttons on the remote control. Fundamentally, this operation manual provides a description based on operation using the remote control.

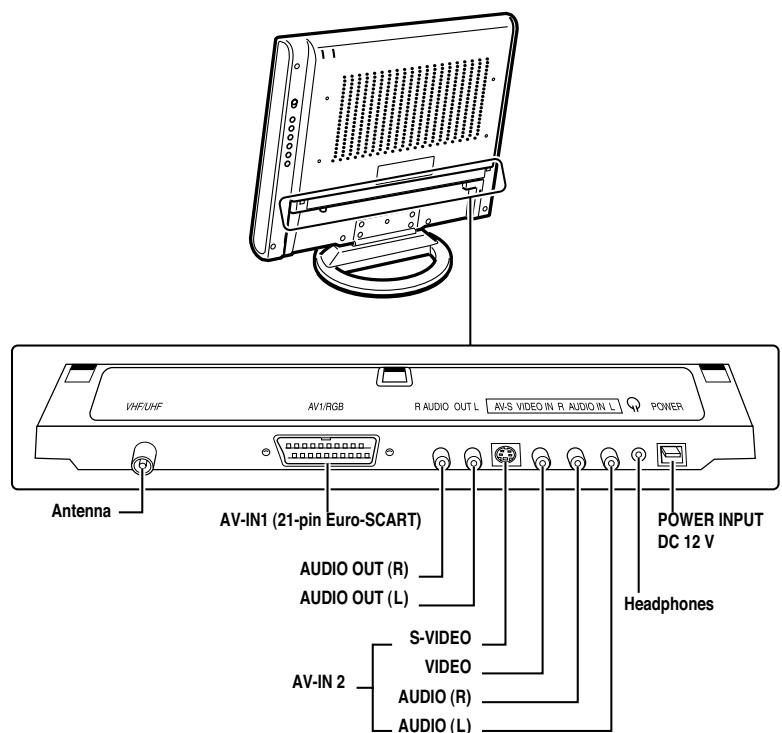
To change the vertical angle of the LCD TV set, tilt the screen up to 10 degrees forward or 20 degrees backward. The TV set can also be rotated 90 degrees horizontally. Please adjust the angle so that the TV set can be watched most comfortably.

Rear control panel

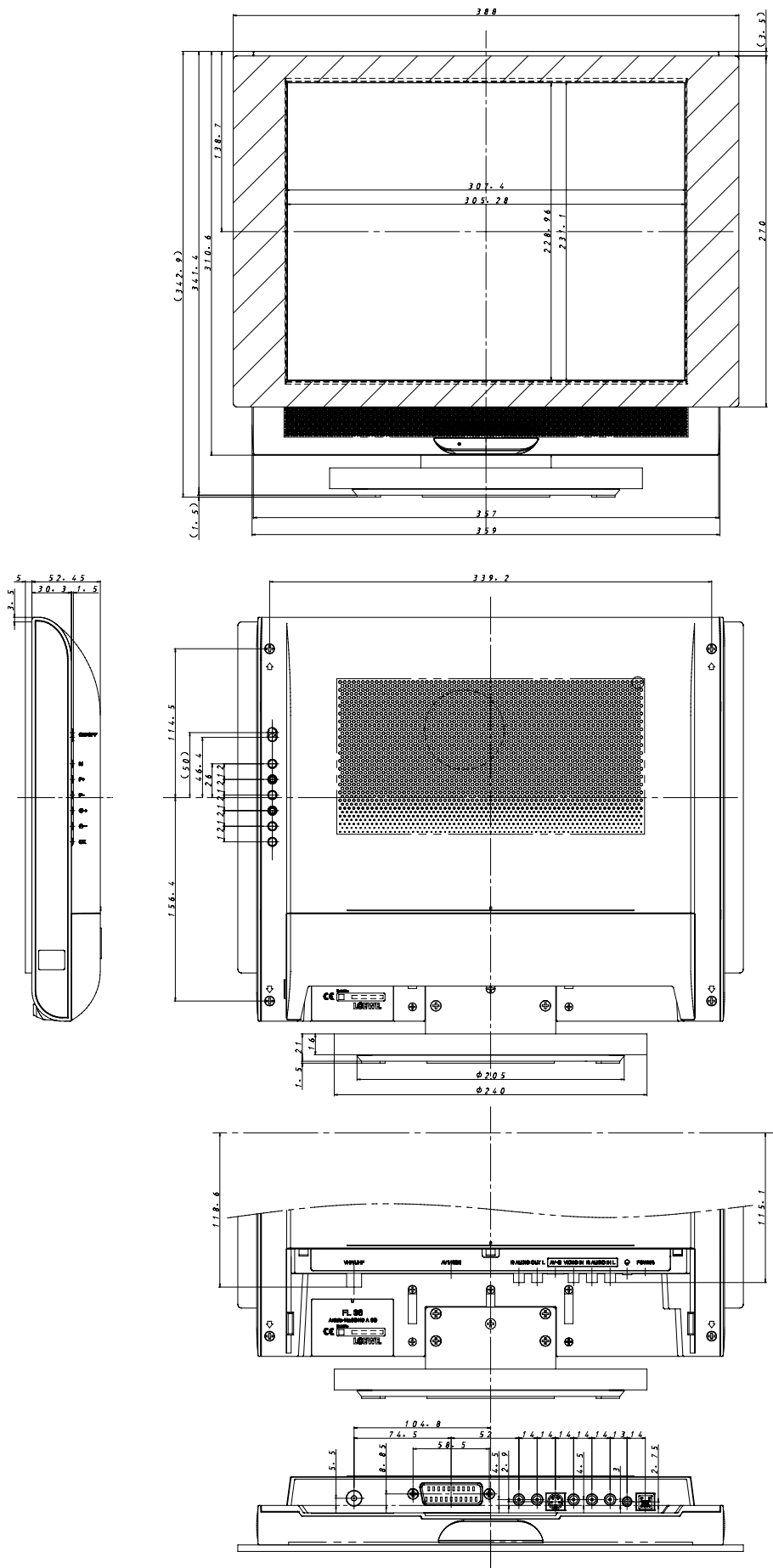


Terminals

Rear view



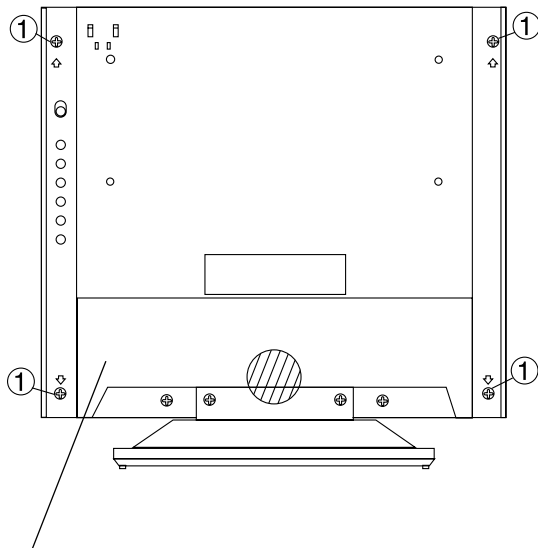
OUTLINE DIMENSION FIGURE



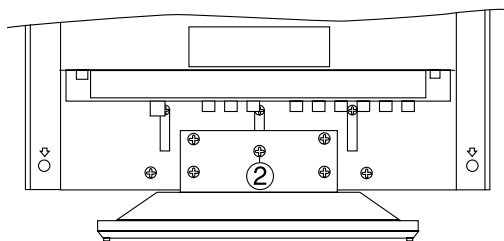
Units: mm

REMOVING OF MAJOR PARTS

1. Insert your finger into the center of the terminal cover and pull it toward you to detach the terminal cover. Remove the screws installing a stand.
2. Remove the four screws "1" and one screw "2".
3. Open the cabinet B by approx. 45° from the bottom of the cabinet (stand side).
4. Remove the lead wire from the cable clamp "3".
5. Remove the power connector "4".
6. Remove the connector "5" from the light reception unit.
7. Remove the lead wire from the cable clamp "6".
8. Remove the speaker connector "7".
9. Remove the FFC from the FFC connector "8" on the main PWB.
10. Remove the connector "9" from the switch PWB.
11. Remove the right and left speaker connectors "10" on the terminal PWB.



Terminal Cover



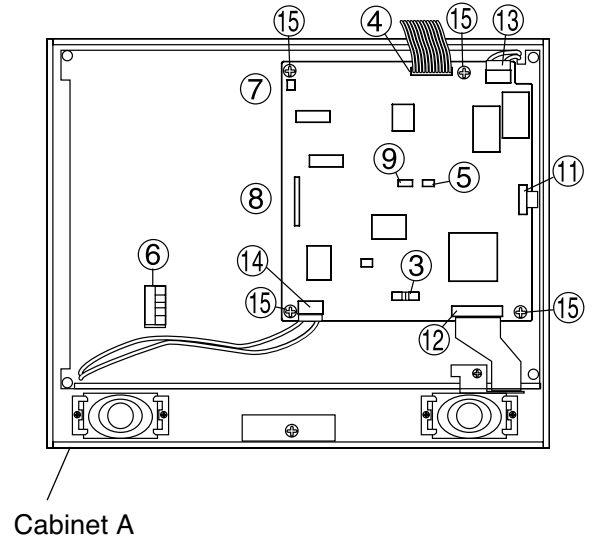
<<Disassembly of the main PWB>>

1. Disconnect the flexible cable connectors "11" and "12" from the LCD panel.
2. Disconnect the cable connectors "13" and "14" from the fluorescent lamp.
3. Remove the four screws "15".

<<Disassembly of the terminal PWB>>

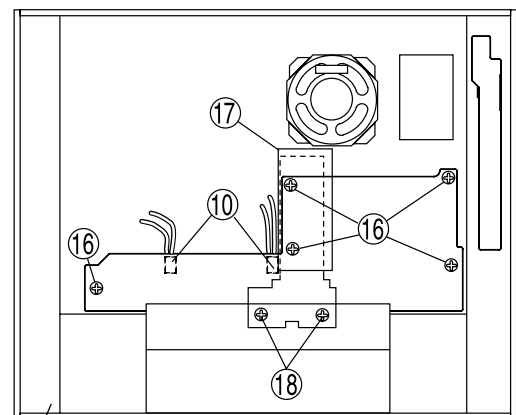
1. Remove the five screws "16".
2. Remove the two screws "18". Remove the cover "17". Take them out of the cabinet holes.

<<Cabinet A side>>



Cabinet A

<<Cabinet B side>>

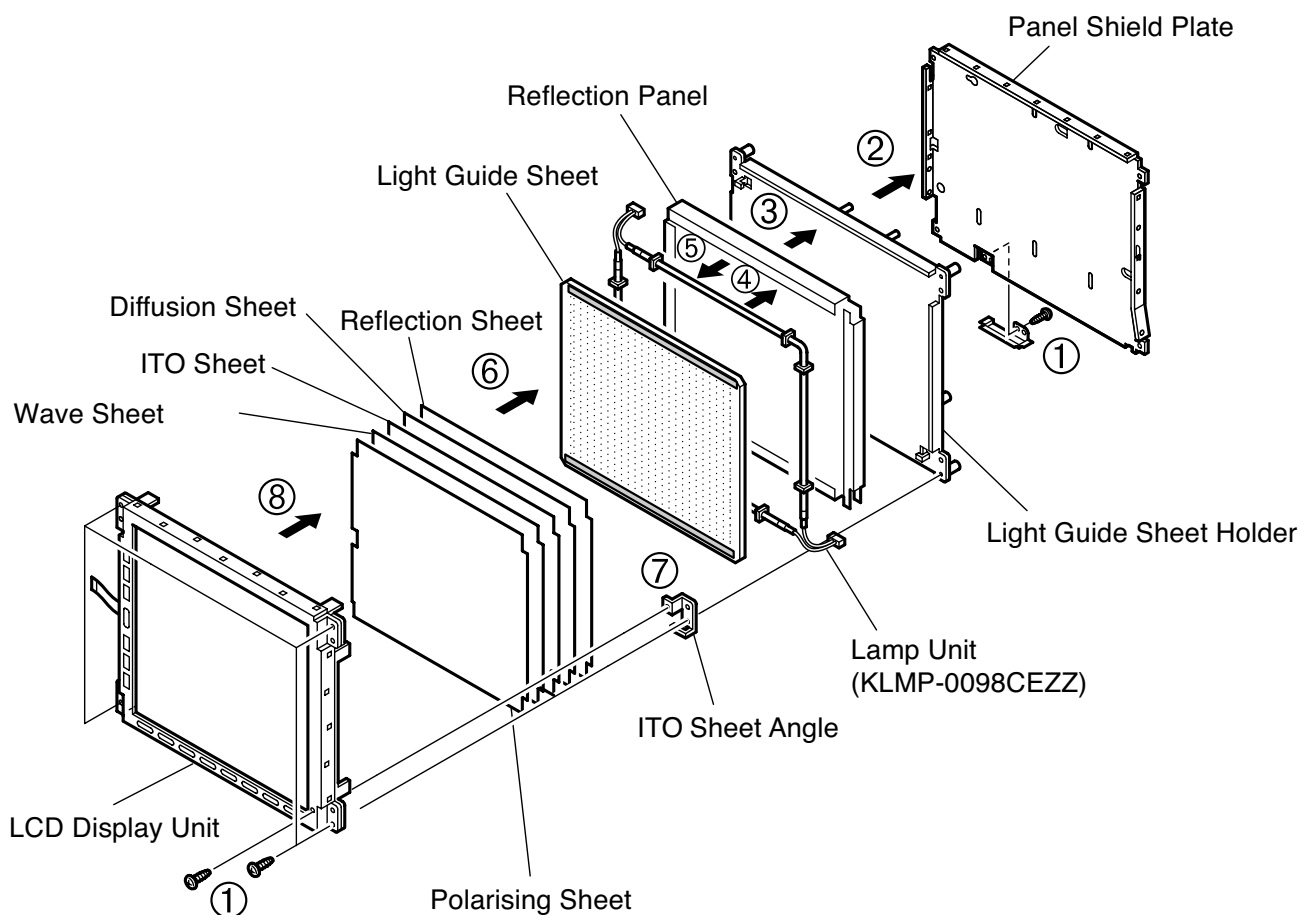


Cabinet B

- Caution for handling the LCD panel
1. Work in a clean room. (Humidity: 50% or more)
 2. A worker must wear arm bands.
 3. Work on a conductive mat.
 4. Do not expose the unit to shock such as fall or vibration.

<<Disassembly of LCD Panel>>

1. Remove the six LCD unit fixing screws.
2. Remove the panel shield plate.
3. Remove the light guide sheet holder.
4. Remove the reflection panel lamp unit.
5. Remove the lamp unit.
6. Remove the light guide sheet.
7. Remove the ITO sheet angle.
8. Remove the ITO sheet, diffusion sheet and the polarising sheet.



ADJUSTING PROCEDURE OF EACH SECTION

[1] Entering the MAIN side adjustment process mode

There are three methods below.

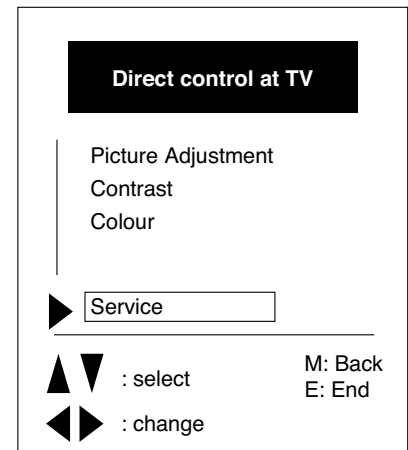
- 1) Press the "Adjustment process key" on the remote control after turning on the power.
- 2) Pressing both the M key and the TV/VIDEO key on the main body, turn on the power. Then, press the volume DOWN key and the tuning UP key at the same time.
- 3) Turn on the power with falling either KEY4 (pin 81 of microprocessor) or KEY5 (pin 82 of microprocessor) to "L".

[Note] For the method 3), the ROM is initialized at the same time. Therefore, 3) must be executed if IC2004 or IC2001 is changed. For 1) or 2), the main body only enters the MAIN side adjustment process.

[2] Entering the TUNER side adjustment process mode

- 4) Entering the TUNER side adjustment process

MENU key on the main body Tuning UP key (remote control)
Select the position shown in the figure below and press the M key (remote control) within 1 second. Enters the adjustment process.



[3] Adjustment

MAIN side adjustment (Press the "M" key to move the cursor and press the volume UP/DOWN key to make an adjustment.)

- Power supply voltage adjustment (+B 5V)
- Model setting
- Inch size setting
- COMMON BIAS adjustment of LCD module
- CUTOFF adjustment

TUNER side adjustment (Press the tuning UP/DOWN key to move the cursor and press the volume UP/DOWN key to make an adjustment.)

- Horizontal size adjustment (LCD adjustments)
- Video adjustment (other adjustments)
 - Y delay
 - Subcontrast
 - Subcolour
 - Subbrightness
 - Tint offset

The TUNER side adjustment is possible. However, it is recommended to replace EAROM (I2).

3-1. +B adjustment

Page 9 of MAIN side adjustment process +B-ADJ
Adjust the voltage of the pin 49 of SC401 to $5.0 \pm 0.05V$.

3-2. Model setting

Page 9 of MAIN side adjustment process MODUL
Set to A2L.

3-3. Inch size setting

Page 9 of MAIN side adjustment process INCH SIZE
Set to 15.

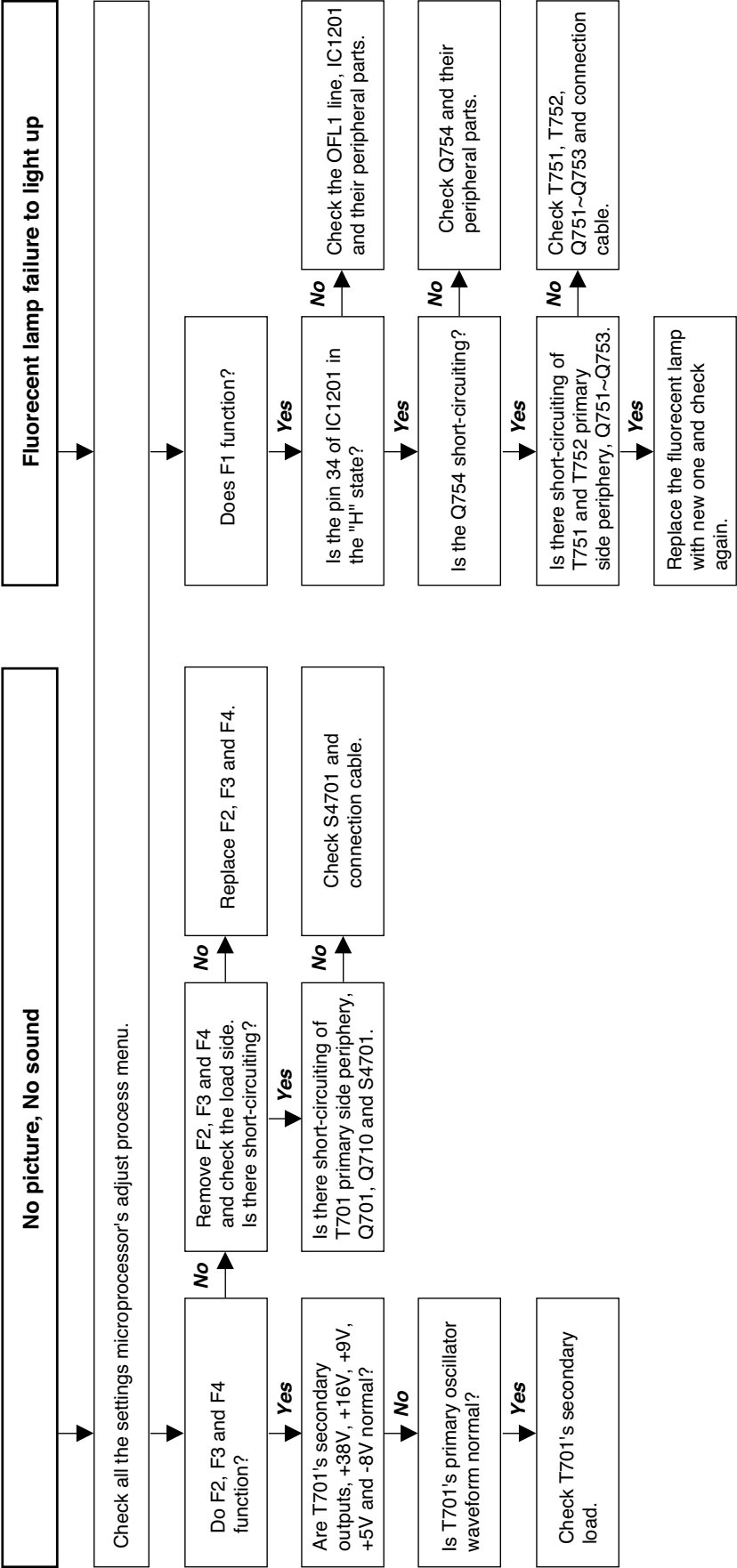
3-4. COMMON BIAS adjustment of LCD module

Page 9 of MAIN side adjustment process COM BIAS
Input the picture of gray scale and adjust it so as to obtain the best contrast.

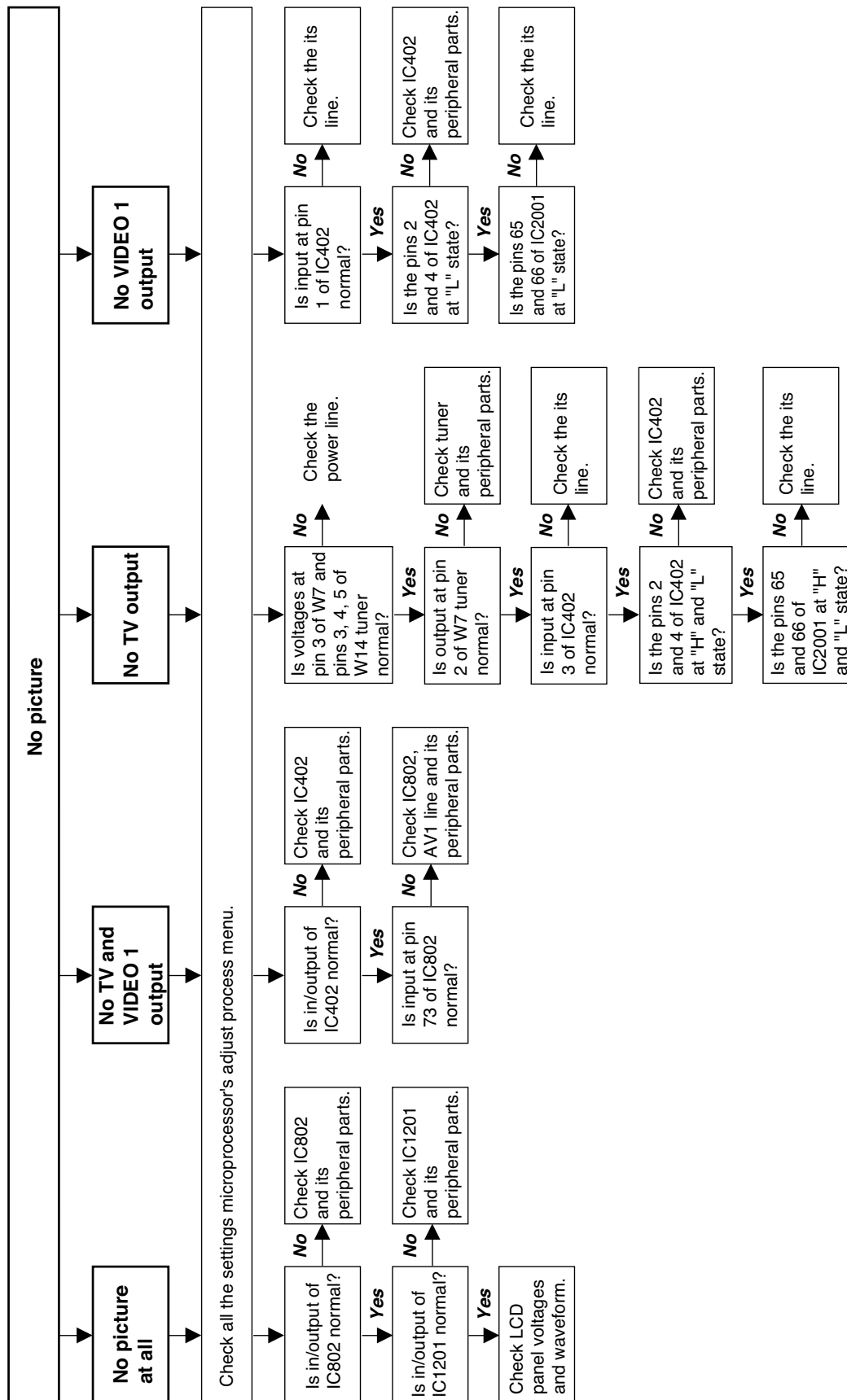
3-5. CUTOFF adjustment

Page 9 of MAIN side adjustment process R CUTOFF, B CUTOFF
Adjust it so as to obtain the optimal colour balance.

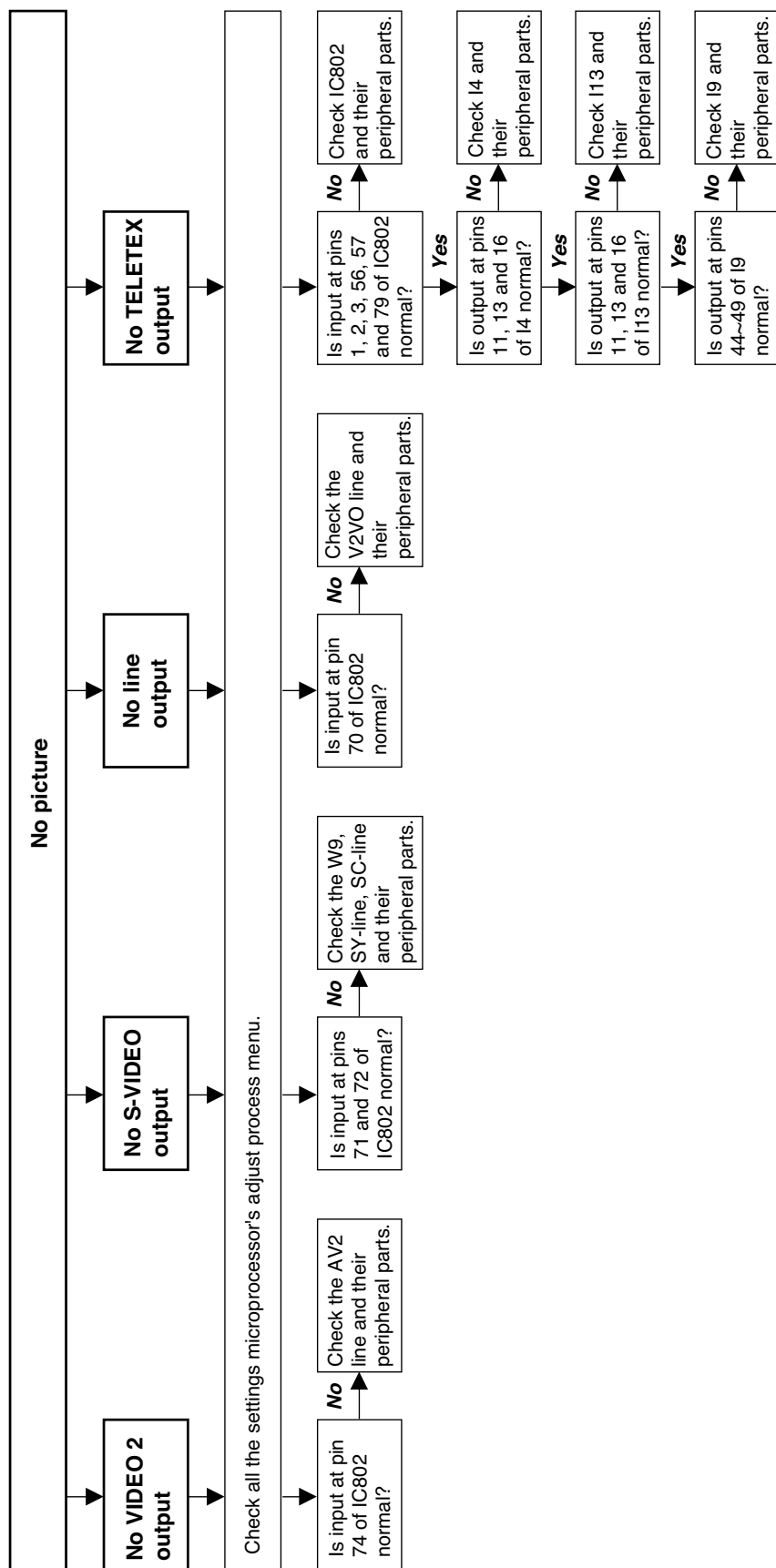
TROUBLE SHOOTING TABLE



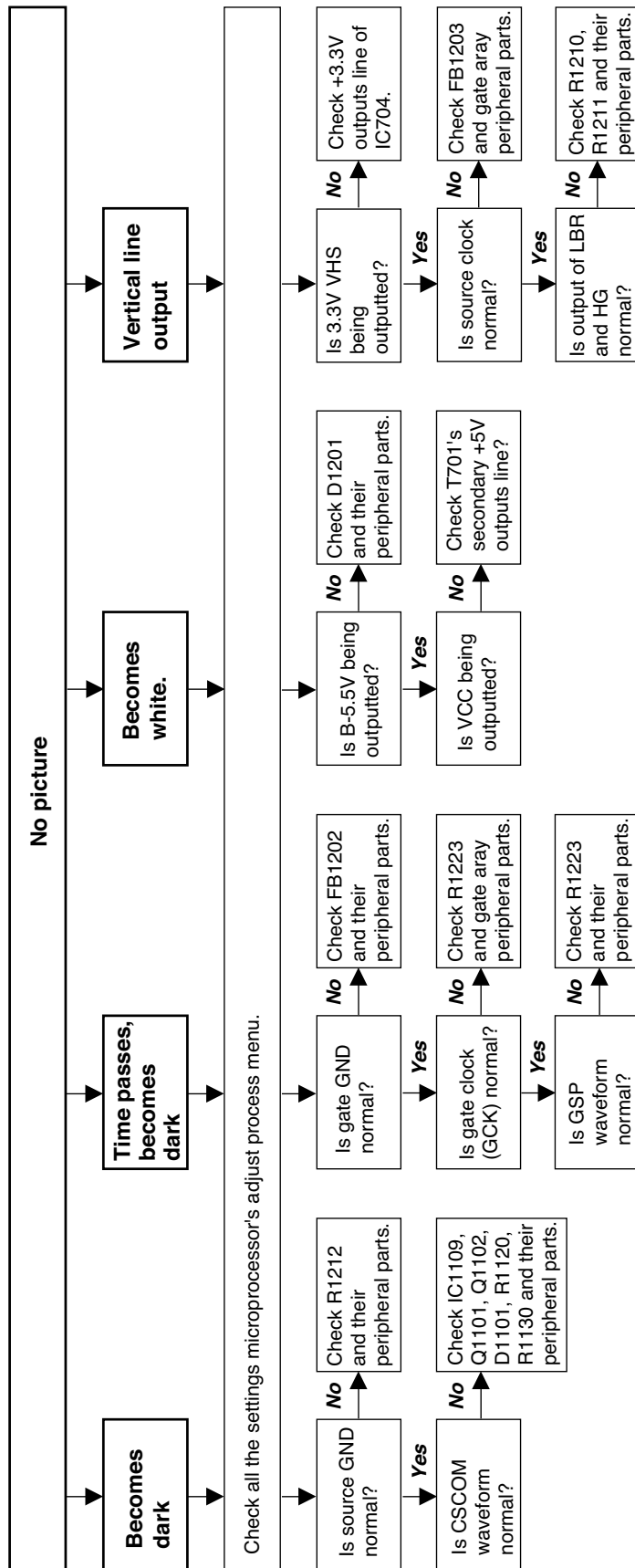
TROUBLE SHOOTING TABLE (Continued)



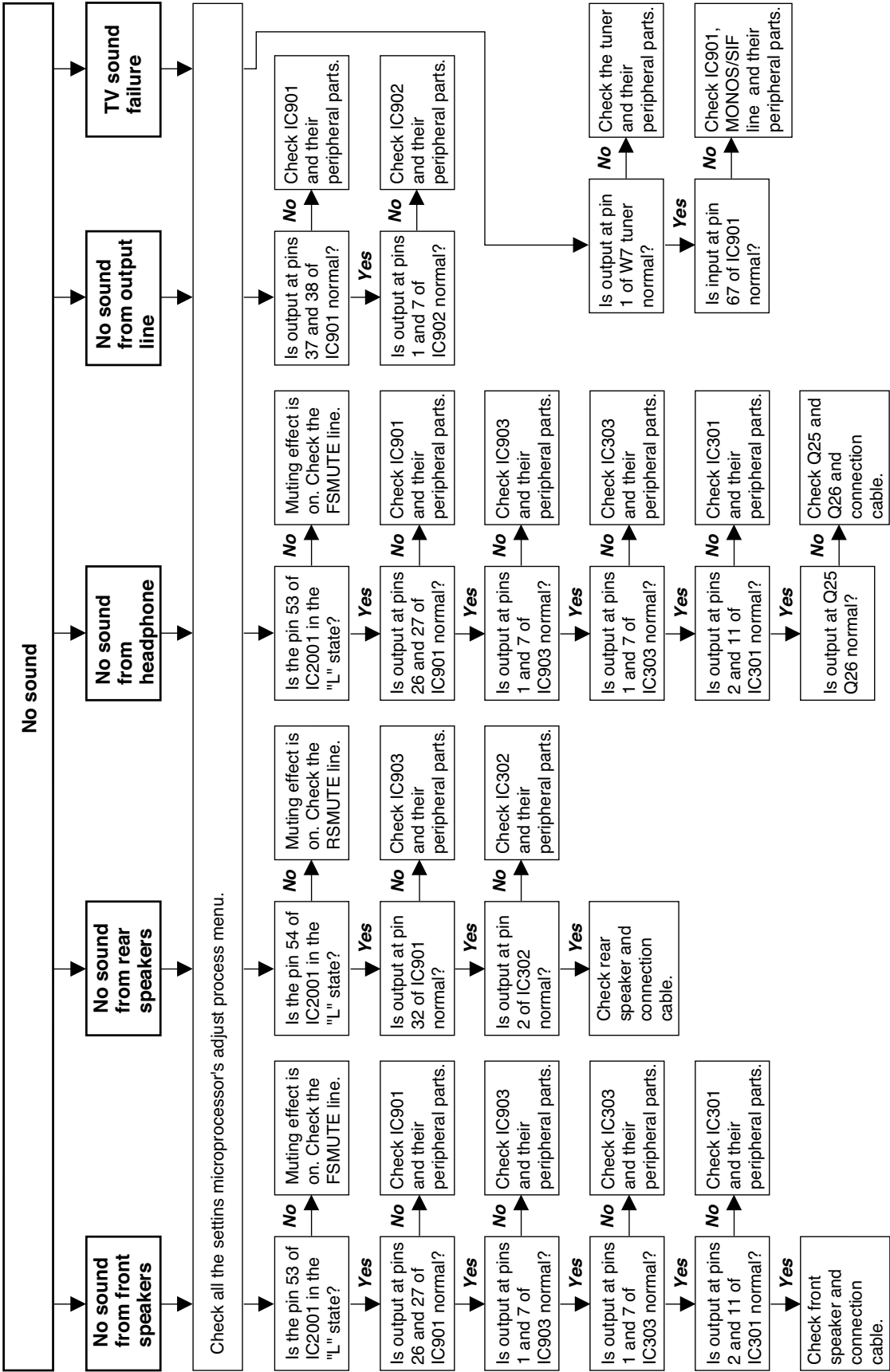
TROUBLE SHOOTING TABLE (Continued)



TROUBLE SHOOTING TABLE (Continued)

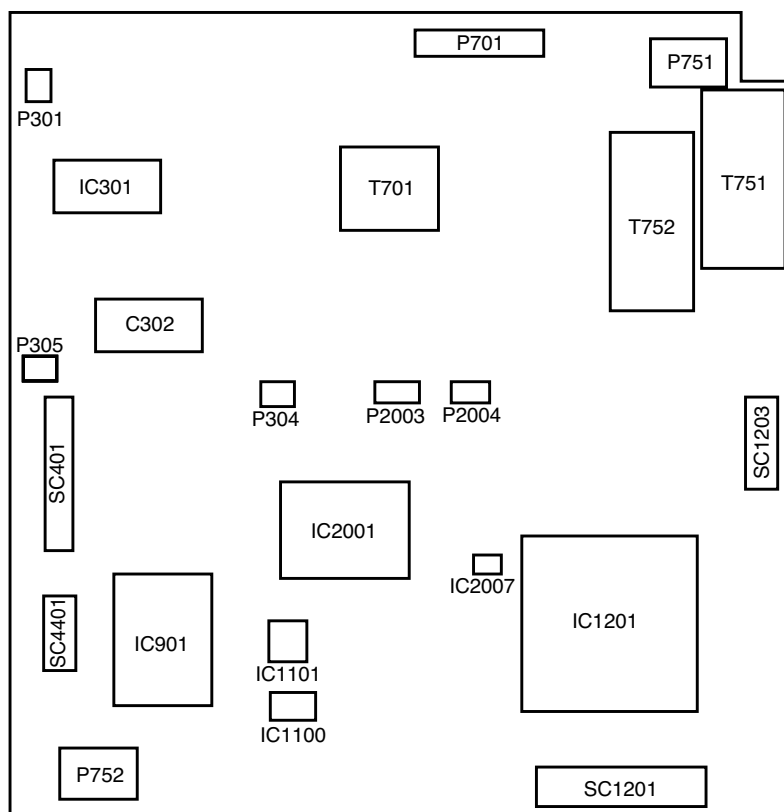


TROUBLE SHOOTING TABLE (Continued)

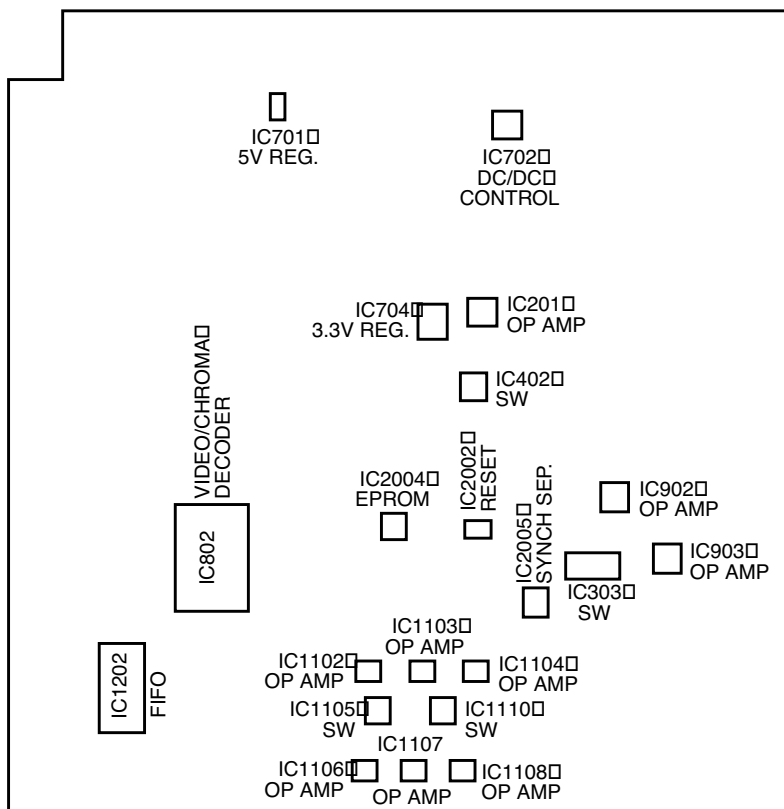


CHASSIS LAYOUT

MAIN Unit (Side-A)



MAIN Unit (Side-B)



1

2

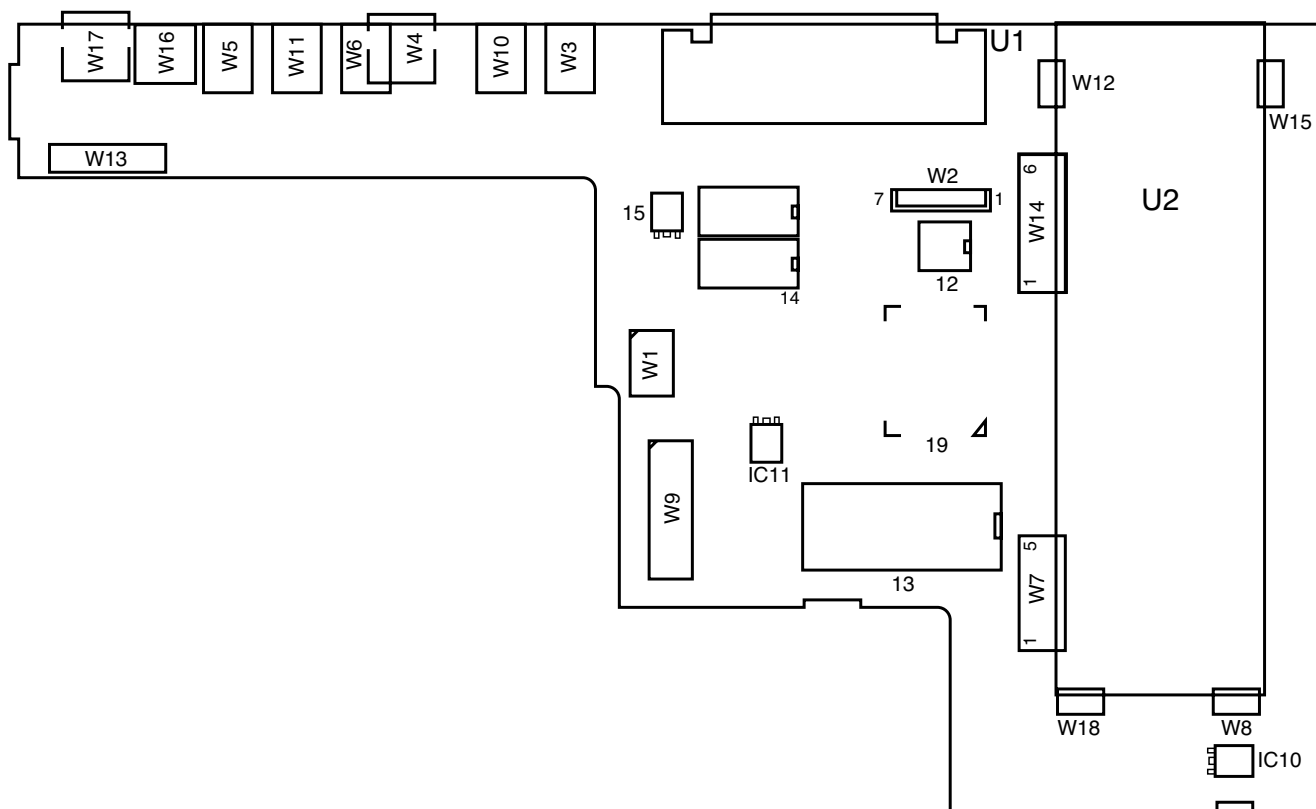
3

4

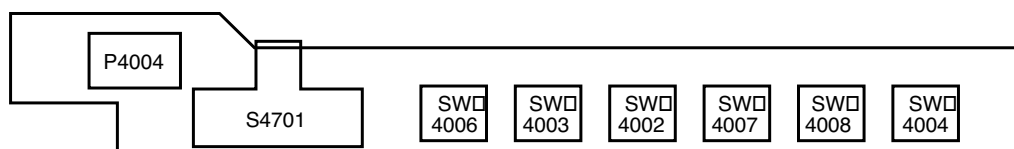
5

6

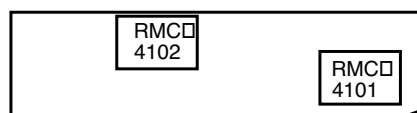
TERMINAL Unit



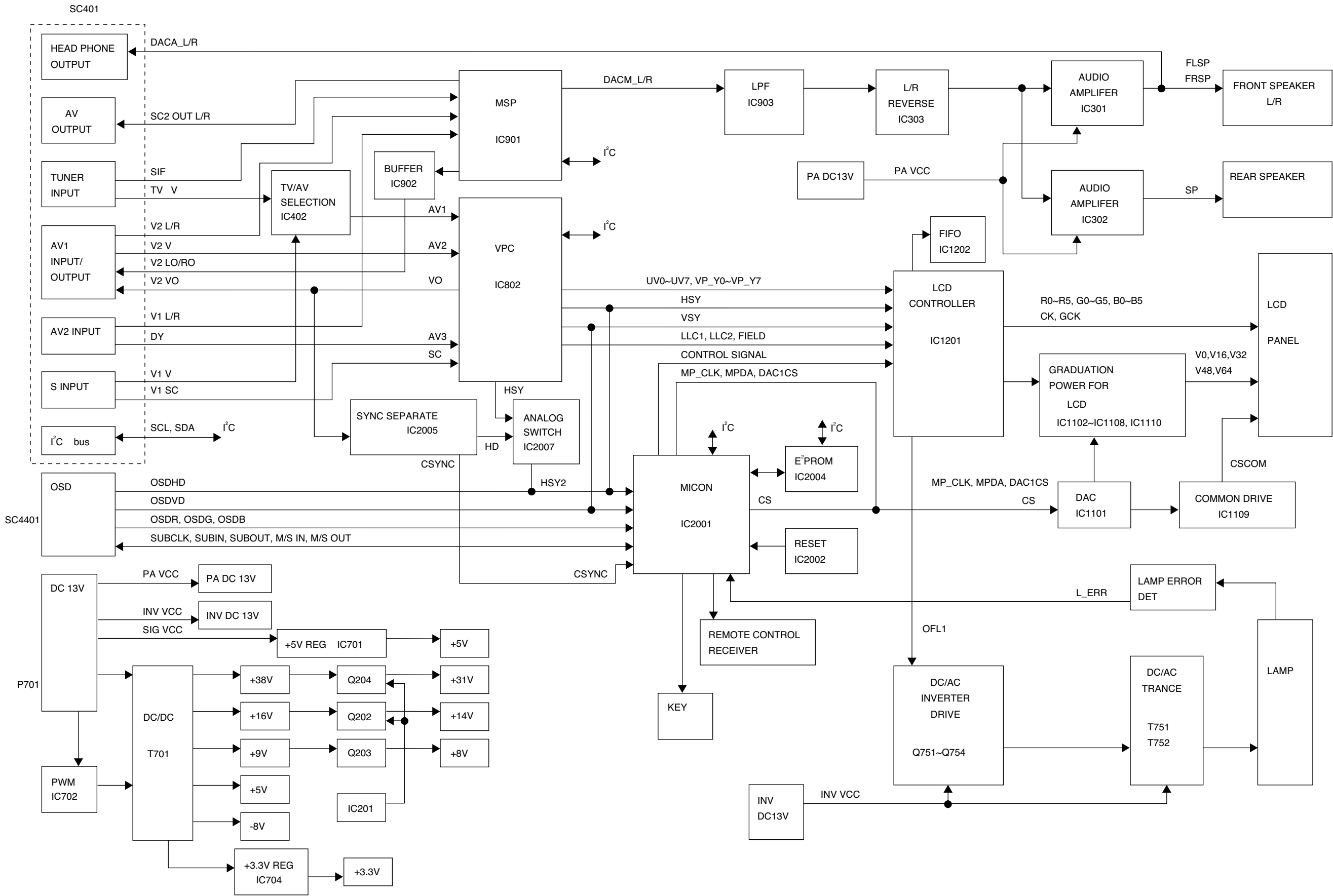
OPERATION Unit



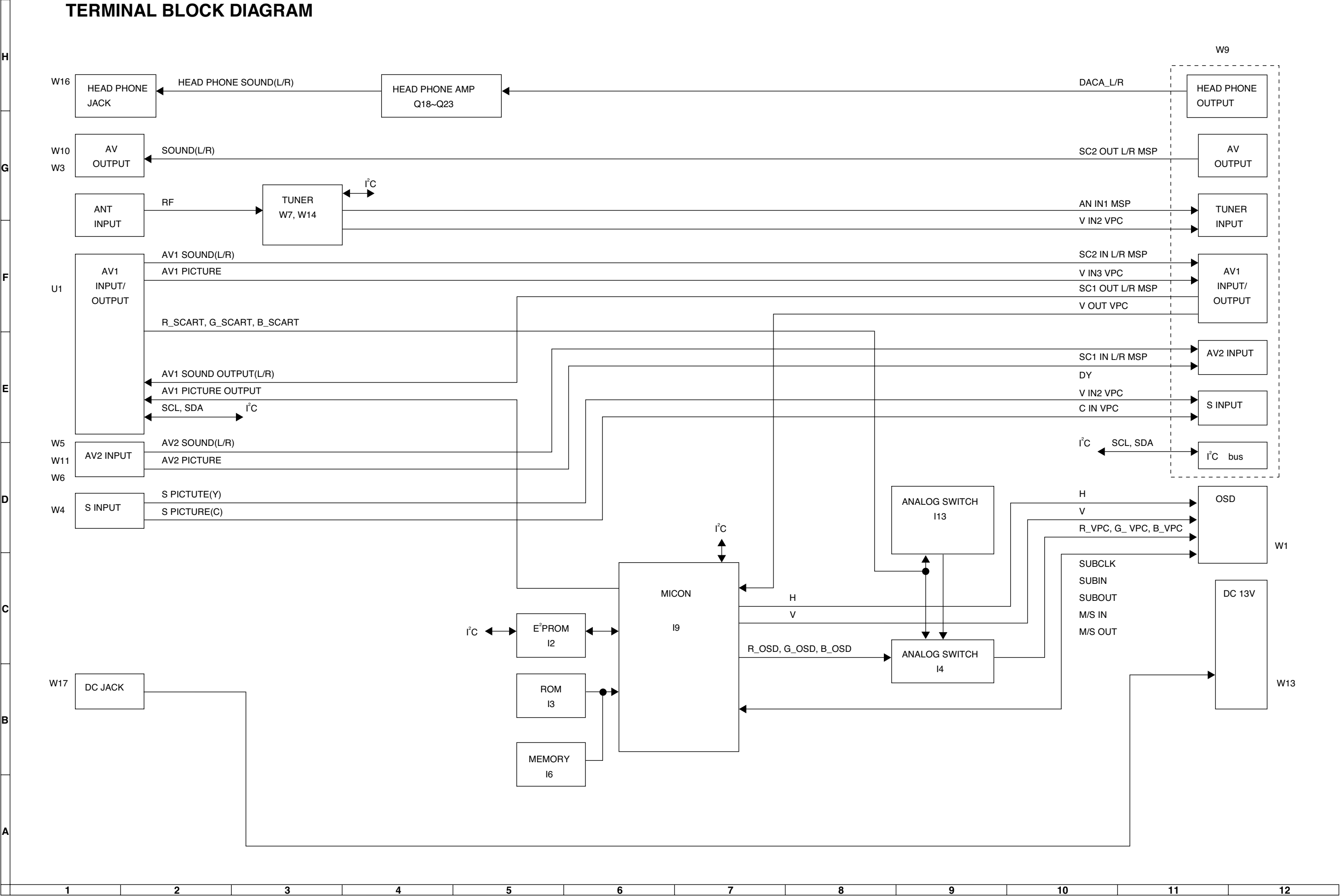
R/C RECEIVER Unit



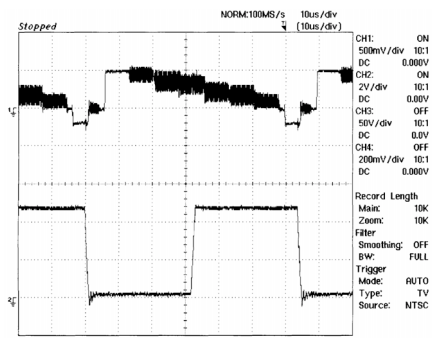
BLOCK DIAGRAMS
MAIN BLOCK DIAGRAM



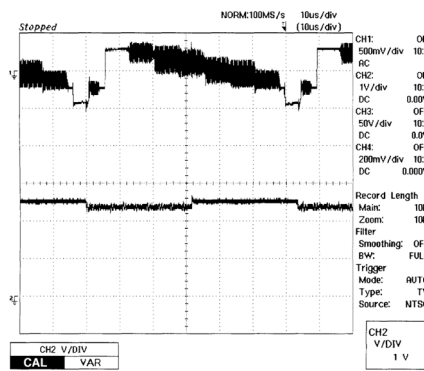
TERMINAL BLOCK DIAGRAM



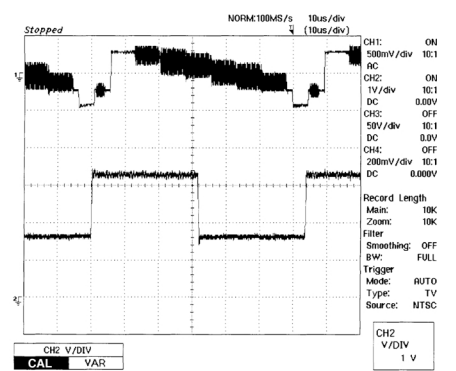
WAVEFORMS



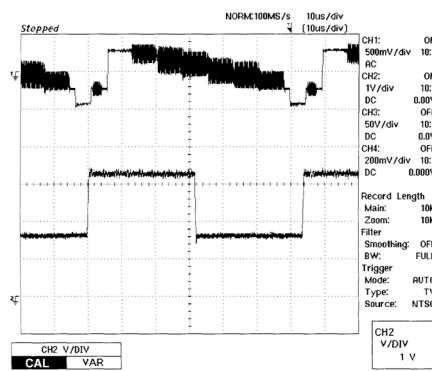
A. V0



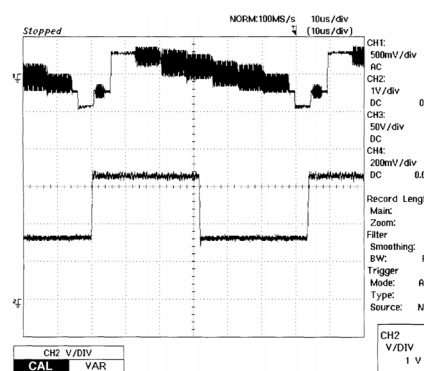
B. V16



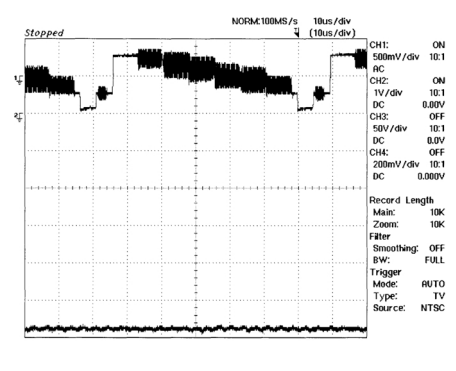
C. V32



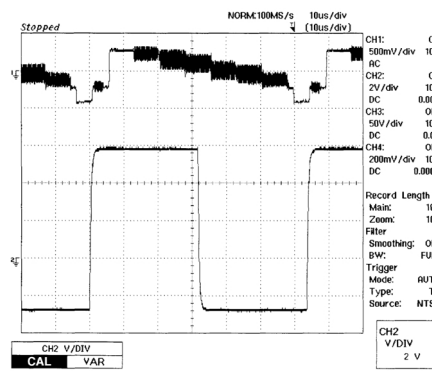
D. V48



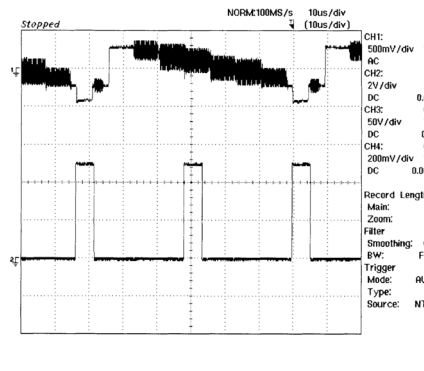
E. V63



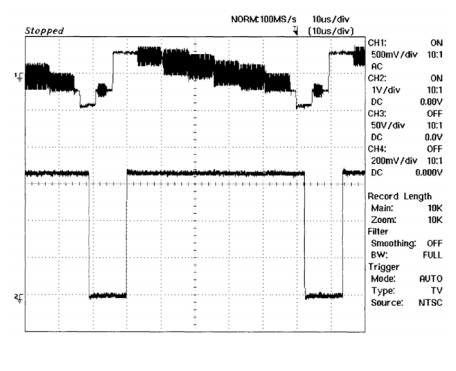
F. B-5.5



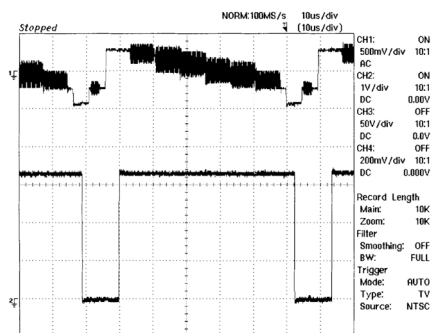
G. CSCOM



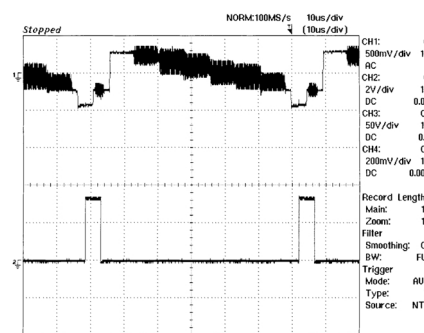
H. GCK



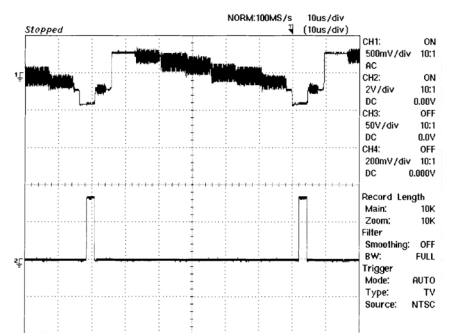
I. GSP



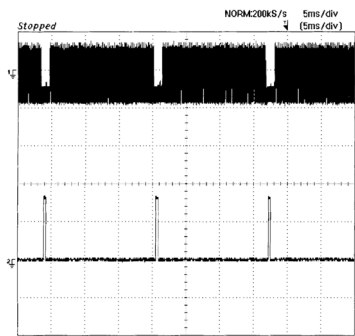
J. VACT



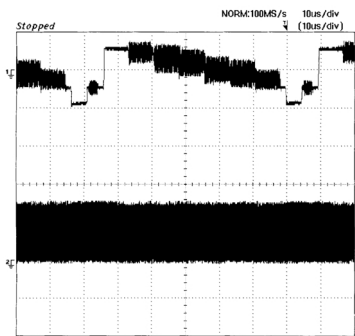
K. HC



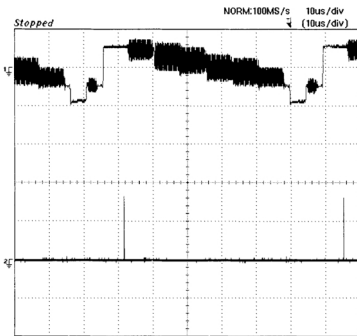
L. HSY



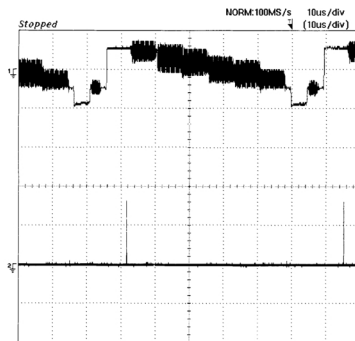
M. VSY



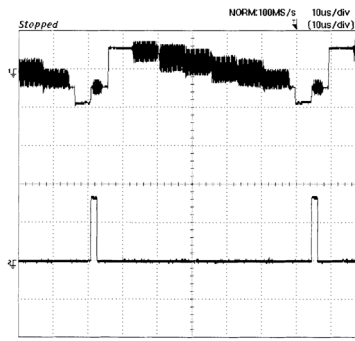
N. CK



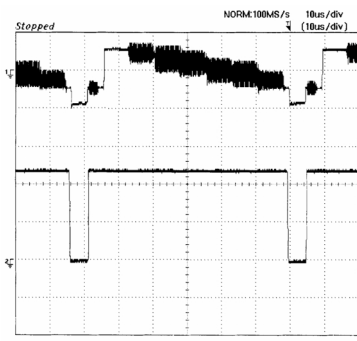
O. SPIO



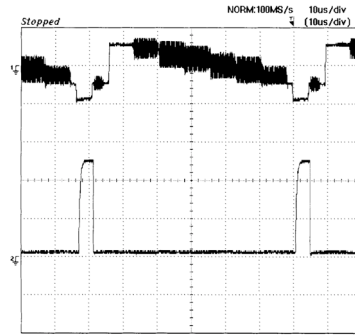
P. SPOI



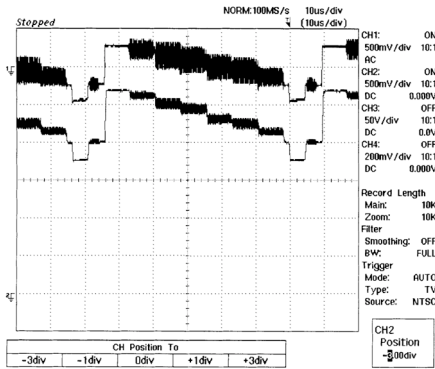
Q. HG



R. IC2005



S. CSYNC



T. VIDEO

DESCRIPTION OF SCHEMATIC DIAGRAM

VOLTAGE MEASUREMENT CONDITION:

1. When the exclusive-use AC adapter is used, the colour bar signal of colour bar generator for service is input to get the normal screen. When the audio is minimized, the voltage value is measured with the 20 k Ω /V tester.

WAVEFORM MEASUREMENT CONDITION:

1. When the exclusive-use AC adapter is used, the colour density, lightness and colour hue are set to the center position, and the signal of colour bar generator for service is observed to get waveform.
The waveform test point is indicated with the mark (📍) in the wiring diagram.

INDICATION OF RESISTOR & CAPACITOR:

RESISTOR

1. The unit of resistance " Ω " is omitted.
(K=k $\times$ 1000 , M=M $\times$).
2. All resistors are $\pm 5\%$, unless otherwise noted.
(J= $\pm 5\%$, F= $\pm 1\%$, D= $\pm 0.5\%$)
3. All resistors are Carbon type, unless otherwise noted.

Ⓢ: Solid	Ⓜ: Cement
Ⓞ: Oxide Film	Ⓣ: Special
Ⓝ: Metal Coating	

CAPACITOR

1. All capacitors are mF, unless otherwise noted.
(P=pF=mmF).
2. All capacitors are Ceramic type, unless otherwise noted.

(ML) : Mylar	(TA) : Tantalum
(PF) : Polypro Film	(ST) : Styrol

CAUTION:

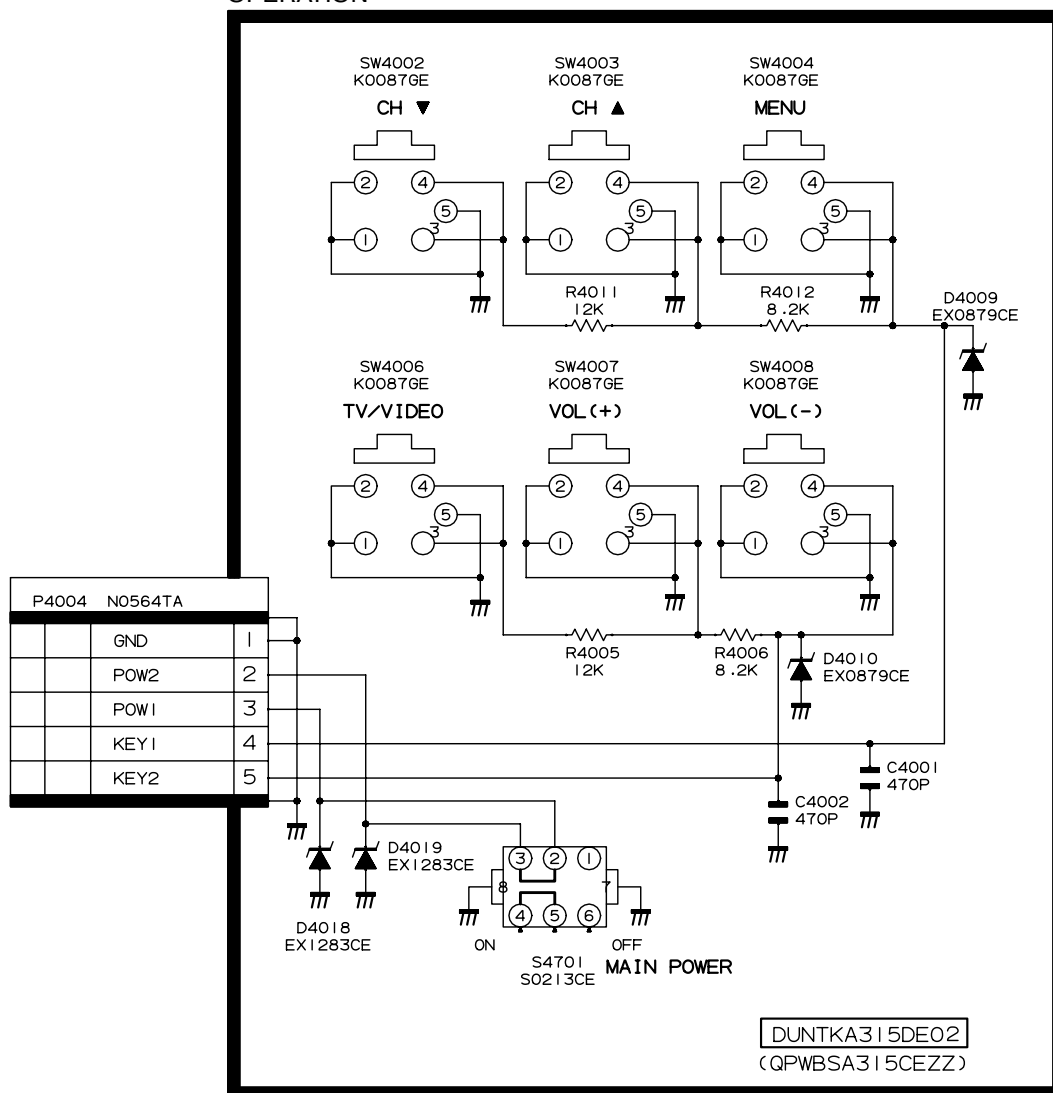
This circuit diagram is original one, therefore there may be a slight difference from yours.

IMPORTANT SAFETY NOTICE:

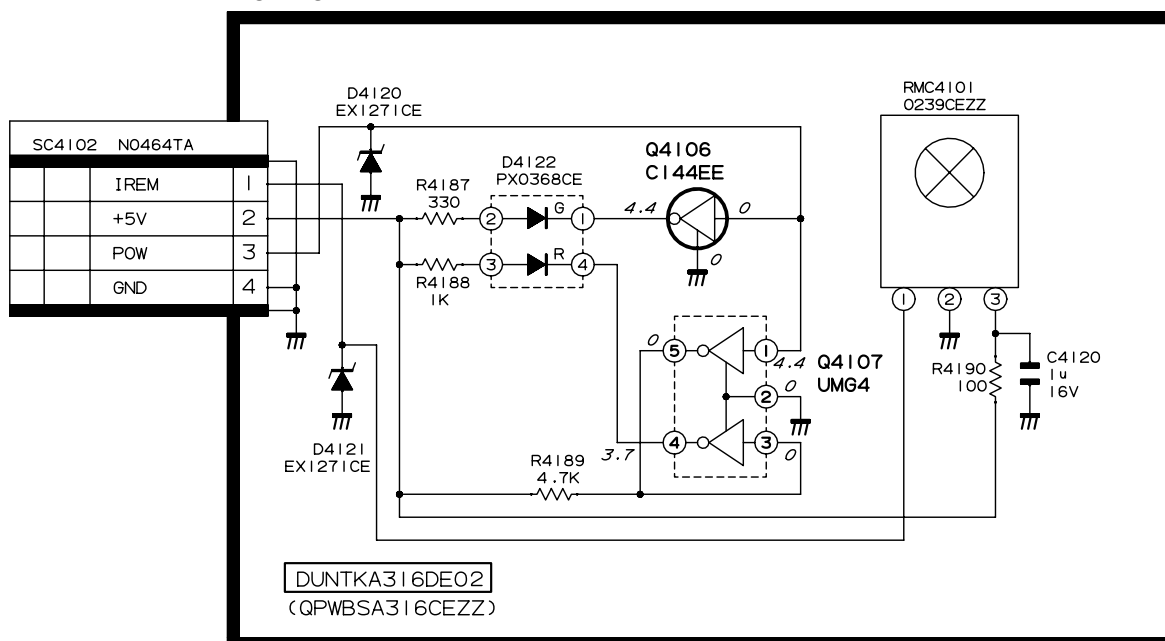
PARTS MARKED WITH "⚠" () ARE IMPORTANT FOR MAINTAINING THE SAFETY OF THE SET. BE SURE TO REPLACE THESE PARTS WITH SPECIFIED ONES FOR MAINTAINING THE SAFETY AND PERFORMANCE OF THE SET.

OPERATION and R/C RECEIVER Units

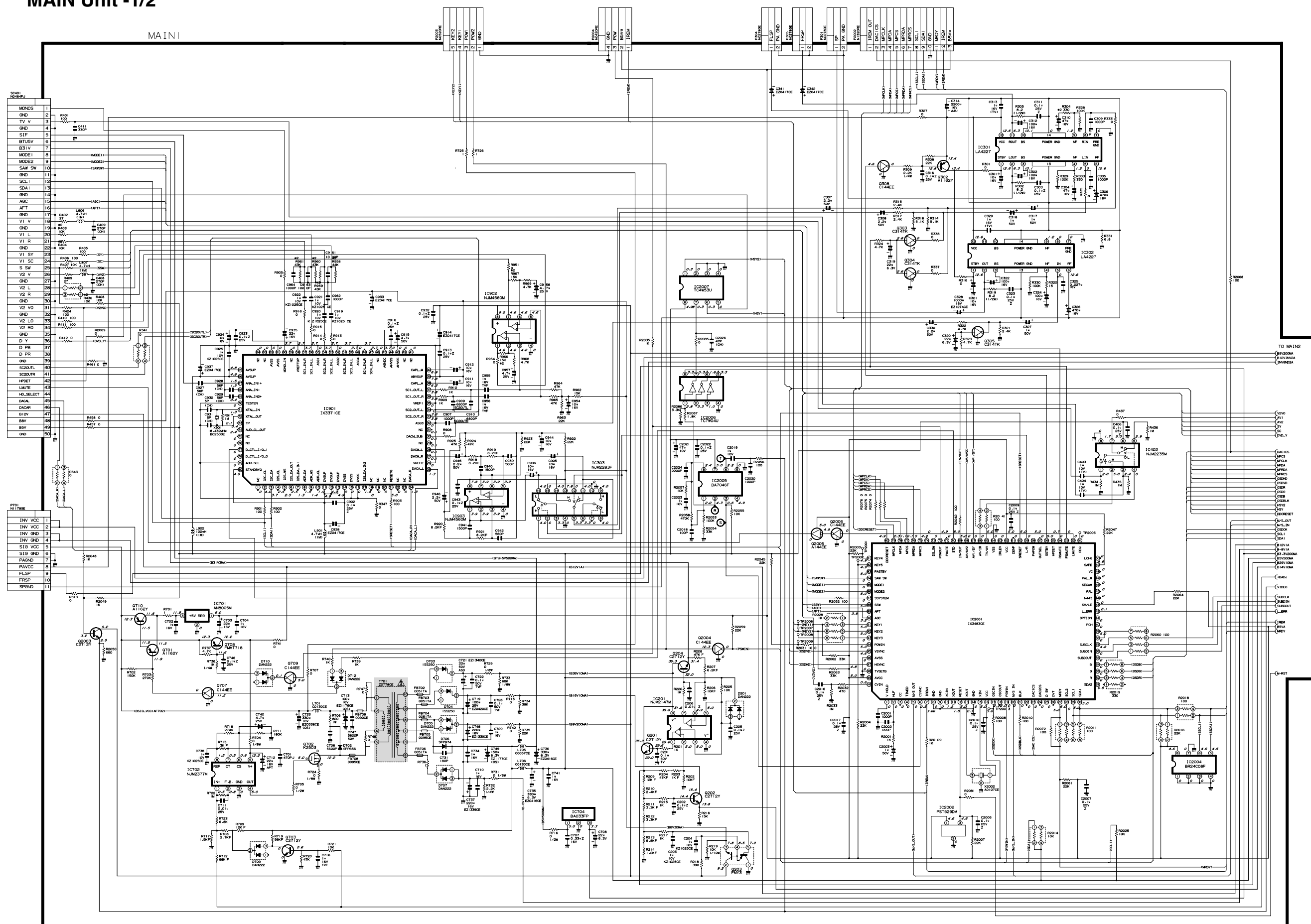
OPERATION



R/C RECEIVER

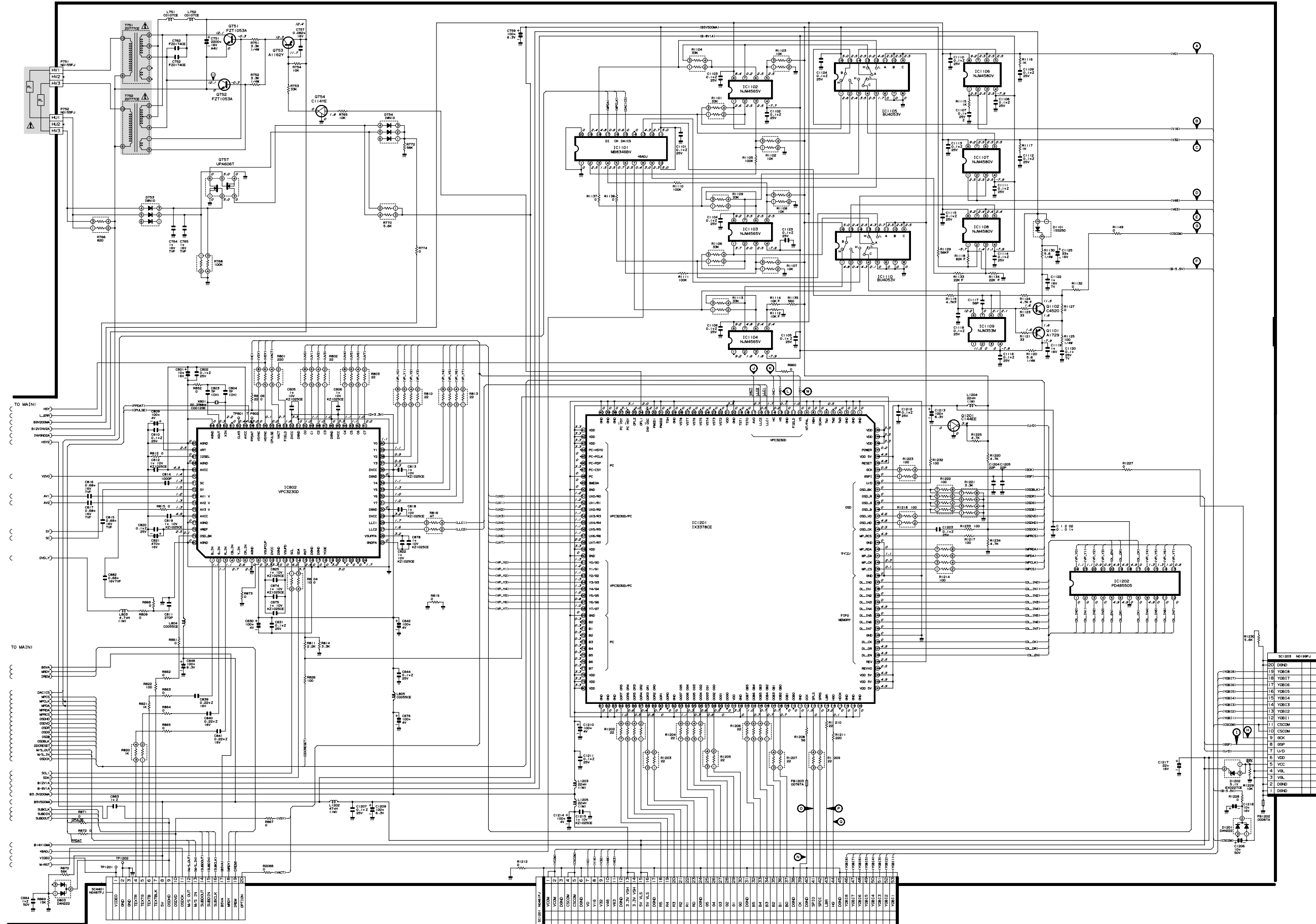


MAIN Unit -1/2

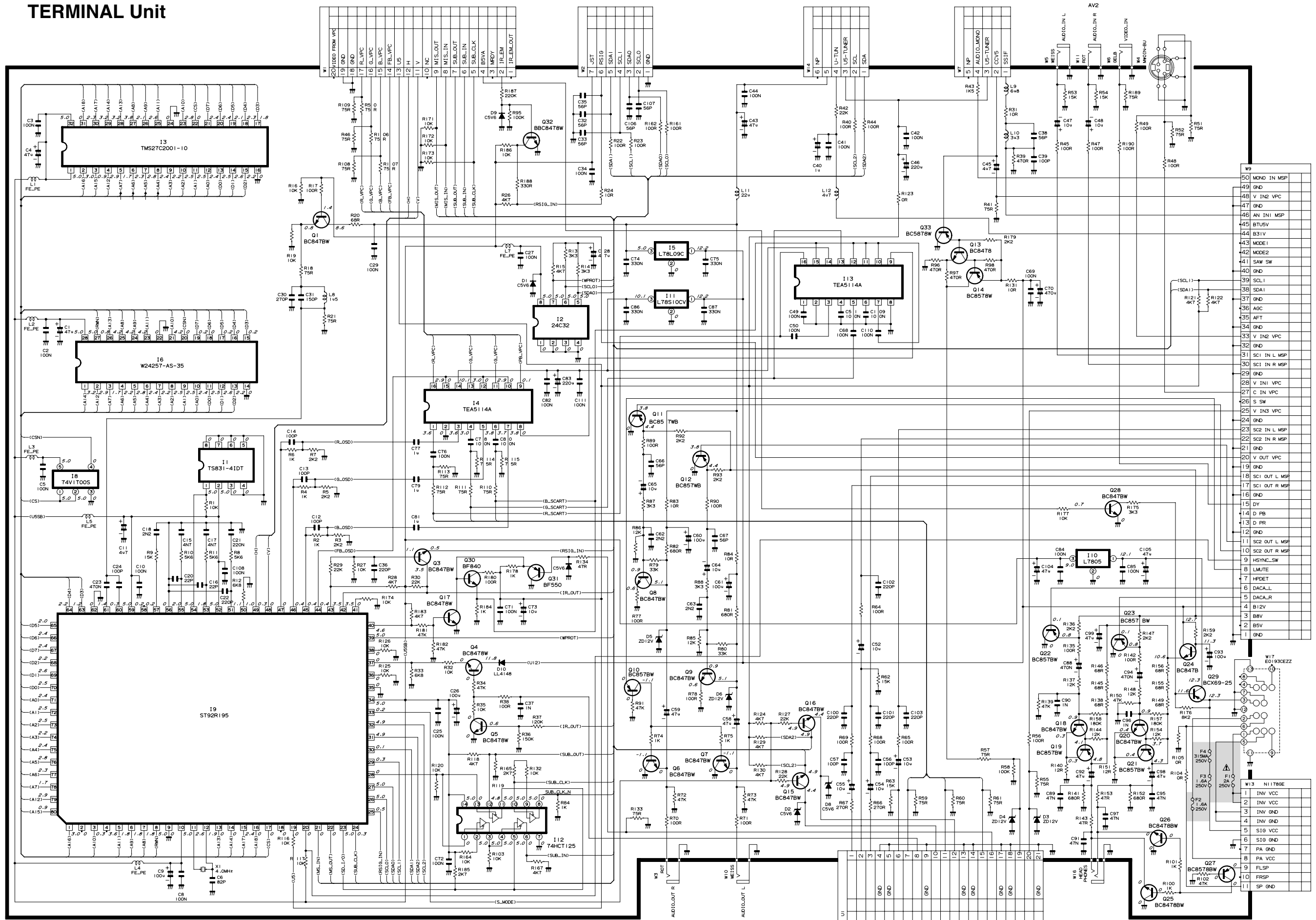


MAIN Unit -2/2

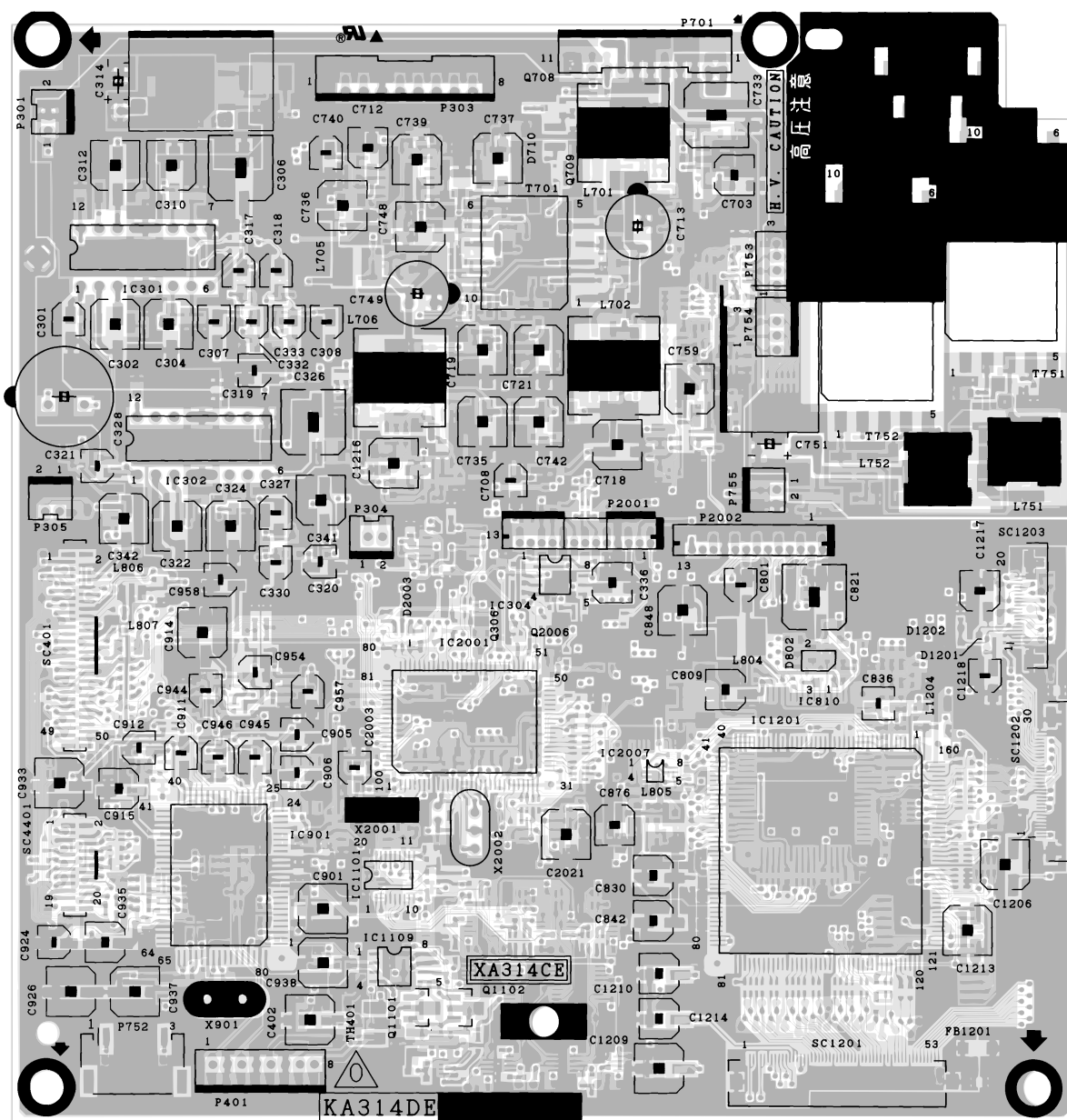
MAIN2



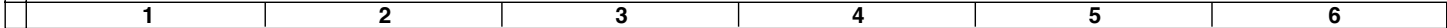
TERMINAL Unit



PRINTED WIRING BOARD ASSEMBLIES

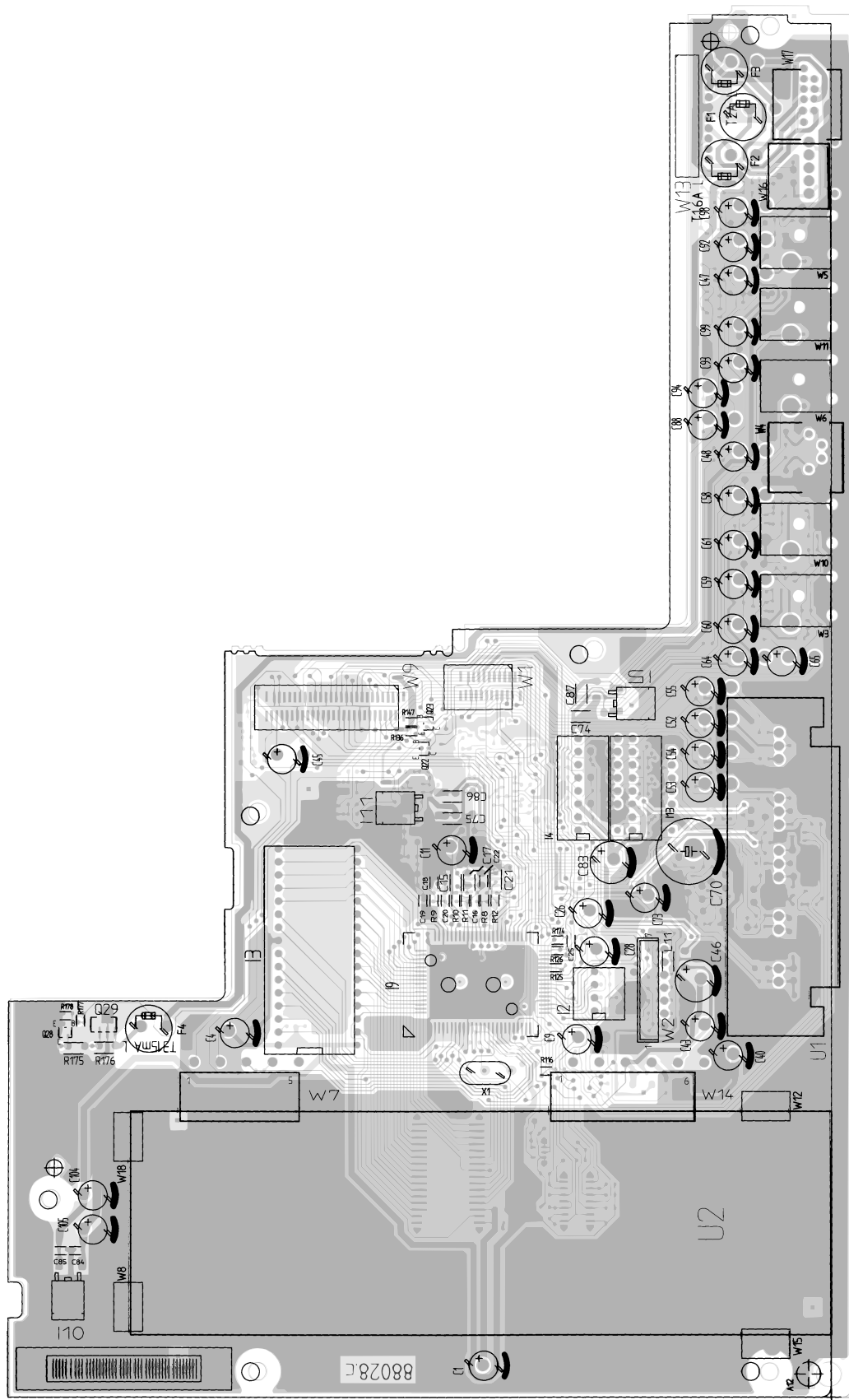


MAIN Unit (Side-A)



31





TERMINAL Unit (Side-B)

H

G

F

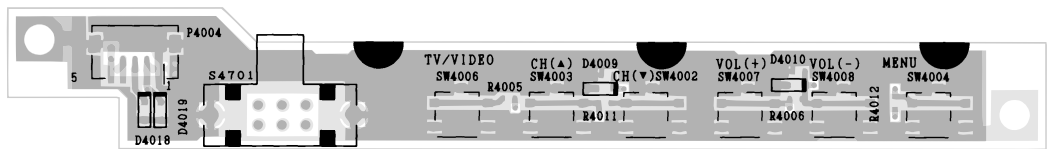
E

D

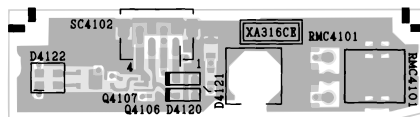
C

B

A



OPERATION Unit (Wiring Side)



R/C RECEIVER Unit (Wiring Side)

1

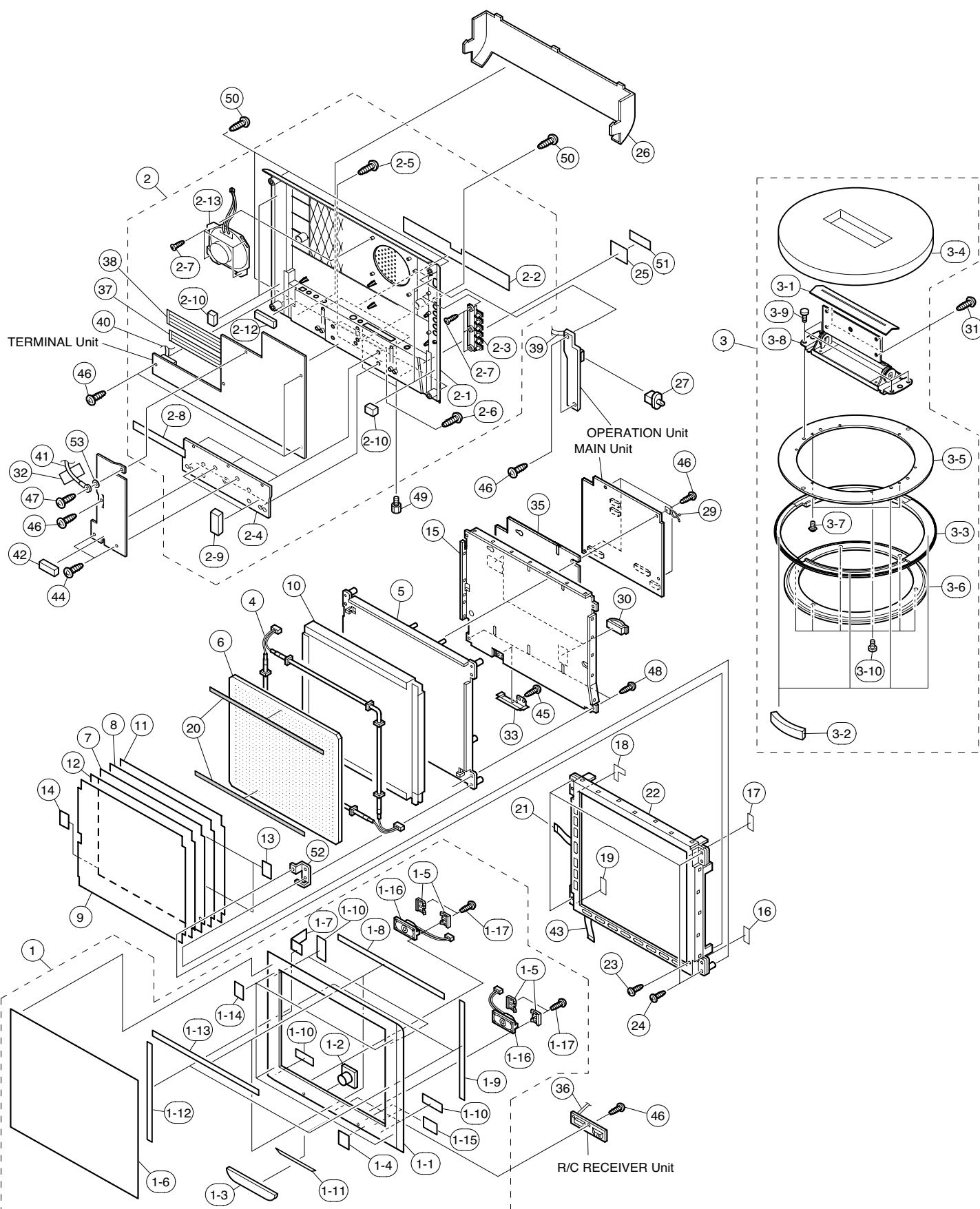
2

3

4

5

CABINET AND MECHANICAL PARTS



1

2

3

4

5

6

PACKING OF THE SET

